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| 09/358,206 | 07/21/99 | CARROLL J | WAB-97090 |

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| EXAMINER | |
|---|---|
| PEREZ,G | |
| ART UNIT | PAPER NUMBER |
| 2834 | 4 |

DATE MAILED: 03/10/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/358,206 | CARROLL, JOHN B. | |
| | Examiner | Art Unit | |
| | Guillermo Perez | 2834 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

**Status**

1)☒ Responsive to communication(s) filed on *23 December 1999* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

14) ☒ Notice of References Cited (PTO-892)
15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
16) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
17) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
18) ☐ Notice of Informal Patent Application (PTO-152)
19) ☐ Other: .

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments with respect to claims 1 to 8 and 11 to 21 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1 to 2, 5 to 7, 11 to 12, 14 to 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (U.S. Pat. No. 5, 945, 749) in view of Oudet et al. (U.S. Pat. No. 5, 559, 378) and further in view of Carrol (U.S. Pat. No. 5, 350, 222).

Li discloses a pneumatically driven electric power generator (figure 1) comprising: a cylinder (9); a piston (1) disposed within said cylinder;

means (4, 6) engaging said piston for biasing said piston from a second position toward a first position whereby said piston oscillates, moving back and forth between said first position and said second position, driven by air supplied through an air supply passage (13) to said cylinder; and

at least one electric coil (7) placed to enclose changing magnetic flux caused by said magnetic moment associated with said piston whereby an emf is generated in said electric coil, so that an external circuit connected to said electric coil receives electric power from said electric coil;

said means engaging said piston for biasing said piston from said second position toward said first position is a compression spring (4, 6) disposed between a piston extension (14) and an end closure (11);

a cylinder extension (11) at least one of formed integrally with and attached to said cylinder, said cylinder extension having an inner surface having a transverse dimension greater than a transverse dimension of said cylinder, said cylinder extension having an end closure; and

an exhaust passage (13) connected to at least one of said cylinder extension and said end closure;

a piston extension at least one of formed integrally with and attached to said piston, at least a portion of said piston extension contacting at least a portion of said cylinder extension to provide positional constraint to said piston;

said portion of said piston extension contacting at least a portion of said cylinder extension is an outer surface of said piston extension and said portion of said cylinder extension is an inner surface of said cylinder extension;

said magnetic moment associated with said piston is provided by a magnet attached to at least one of said piston and said piston extension;

said magnetic moment associated with said piston is provided by forming at least one of said piston and said piston extension of a material having a magnetic moment. However, Li does not disclose a cylinder having a first end connectable through an inlet

flow path to an air supply passage containing air at a positive pressure, a second end of said cylinder being open; nor that

said piston is also positionable in a second location wherein said first portion of said piston is outside of said cylinder so that clearance is provided between said piston and said cylinder so that air may exhaust from said cylinder; nor

a first cylinder having a first end connectable through a first inlet flow path to an air supply passage, a second end of said first cylinder being open;

second cylinder having a first end connectable through a second inlet flow path to said air supply passage, a second end of said second cylinder being open;

a piston having a magnetic moment associated therewith, said piston having a first end portion and a second end portion, said piston being positionable in a first location wherein said first end portion of said piston is disposed within said first cylinder and said second end portion of said piston is disposed outside of said second cylinder, said piston further being positionable in a second location wherein said second end portion of said piston is disposed within said second cylinder and said first portion of said piston is outside of said first cylinder;

so that when said piston is disposed in said first position, air pressure received in said first cylinder through said first inlet flow path drives said piston toward said second position, whereupon said first cylinder exhausts, and when said piston is disposed in said second position, air pressure received in said second cylinder through said second

inlet flow path drives said piston toward said first position, whereupon said second cylinder exhausts, so that said piston oscillates; nor

sealing means disposed on at least one of an outer surface of said first portion of said piston and an inner surface of said cylinder to prevent loss of air between said piston and said cylinder and permit air pressure in said cylinder to increase when said first portion of said piston is disposed within said cylinder; nor that said sealing means is an O-ring in a groove formed on said outer surface of said first portion of said piston; nor that said inlet flow path includes an electrically actuated shutoff valve to prevent air flow through said generator, thereby turning off said generator; nor that said at least one electric coil is connected to a rectifier to supply DC electric power; nor that said rectifier is a full bridge rectifier to supply DC electric power whenever a net flux through said at least one electric coil is changing.

Oudet et al. disclose a pneumatic device (figure 5) comprising:

a cylinder (70) having a first end (75) connectable through an inlet flow path (80) to an air supply passage containing air at a positive pressure, a second end of said cylinder being open (91, 93);

a piston (56) having a magnetic moment associated therewith, said piston being positionable in a first location wherein at least a first portion of said piston is disposed within said cylinder;

said piston also being positionable in a second location wherein said first portion of said piston is outside of said cylinder so that clearance is provided between said

piston and said cylinder so that air may exhaust from said cylinder (column 8, lines 48 to 58);

means (52) engaging said piston for biasing said piston from said second position toward said first position so that after said cylinder has substantially exhausted, said piston moves to said first position, whereby said piston oscillates, moving back and forth between said first position and said second position, driven by air supplied through such air supply passage to said cylinder; and

at least one electric coil (100) placed to enclose changing magnetic flux caused by said magnetic moment associated with said piston whereby an emf is generated in said electric coil, so that an external circuit connected to said electric coil receives electric power from said electric coil;

said means engaging said piston for biasing said piston from said second position to said first position is a spring (52);

first cylinder (70) having a first end (75) connectable through a first inlet flow path (80) to an air supply passage, a second end of said first cylinder being open (91, 93);

second cylinder (71) having a first end (76) connectable through a second inlet flowpath (82) to said air supply passage, a second end of said second cylinder being open (90, 92);

a piston (56) having a magnetic moment associated therewith, said piston having a first end portion and a second end portion, said piston being positionable in a first location wherein said first end portion of said piston is disposed within said first cylinder

and said second end portion of said piston is disposed outside of said second cylinder, said piston further being positionable in a second location wherein said second end portion of said piston is disposed within said second cylinder and said first portion of said piston is outside of said first cylinder;

so that when said piston is disposed in said first position, air pressure received in said first cylinder through said first inlet flowpath drives said piston toward said second position, whereupon said first cylinder exhausts, and when said piston is disposed in said second position, air pressure received in said second cylinder through said second inlet flowpath drives said piston toward said first position, whereupon said second cylinder exhausts, so that said piston oscillates (column 8, lines 48 to 58); and

at least one electric coil (100, 101) placed to enclose changing magnetic flux caused by said magnetic moment associated with said piston whereby an emf is generated in said electric coil, so that an external circuit connected to said electric coil receives electric power from said electric coil;

said actuator further includes a spring (51, 52) engaging said piston to bias said piston toward one of said first position and said second position to facilitate starting said generator when air is supplied through said first air supply passage and said second air supply passage for the purpose of generating a force by means of significant applied electric power and having optimal space requirements.

Carroll discloses sealing means (79, 80) disposed on at least one of an outer surface of said first portion of said piston (70) and an inner surface (65) of said cylinder;

and that said sealing means is an O-ring inserted in a groove formed on said outer surface of said first portion of said piston for the purpose of avoiding escape of air between the piston and the cylinder.

It would have been obvious at the time the invention was made to modify the electromagnetic actuator of Li and provide it with a cylinder having a first end connectable through an inlet flow path to an air supply passage containing air at a positive pressure, a second end of said cylinder being open; and a piston having a magnetic moment associated therewith, said piston being positionable in a first location wherein at least a first portion of said piston is disposed within said cylinder; and said piston also being positionable in a second location wherein said first portion of said piston is outside of said cylinder so that clearance is provided between said piston and said cylinder so that air may exhaust from said cylinder; and means engaging said piston for biasing said piston from said second position toward said first position so that after said cylinder has substantially exhausted, said piston moves to said first position, whereby said piston oscillates, moving back and forth between said first position and said second position, driven by air supplied through such air supply passage to said cylinder; and at least one electric coil placed to enclose changing magnetic flux caused by said magnetic moment associated with said piston whereby an emf is generated in said electric coil, so that an external circuit connected to said electric coil receives electric power from said electric coil; in which said means engaging said piston for biasing said piston from said second position to said first position is a spring; and a first

cylinder having a first end connectable through a first inlet flow path to an air supply passage, a second end of said first cylinder being open; and a second cylinder having a first end connectable through a second inlet flow path to said air supply passage, a second end of said second cylinder being open; and a piston having a magnetic moment associated therewith, said piston having a first end portion and a second end portion, said piston being positionable in a first location wherein said first end portion of said piston is disposed within said first cylinder and said second end portion of said piston is disposed outside of said second cylinder, said piston further being positionable in a second location wherein said second end portion of said piston is disposed within said second cylinder and said first portion of said piston is outside of said first cylinder; so that when said piston is disposed in said first position, air pressure received in said first cylinder through said first inlet flow path drives said piston toward said second position, whereupon said first cylinder exhausts, and when said piston is disposed in said second position, air pressure received in said second cylinder through said second inlet flow path drives said piston toward said first position, whereupon said second cylinder exhausts, so that said piston oscillates; and at least one electric coil placed to enclose changing magnetic flux caused by said magnetic moment associated with said piston whereby an emf is generated in said electric coil, so that an external circuit connected to said electric coil receives electric power from said electric coil; and said actuator further includes a spring engaging said piston to bias said piston toward one of said first position and said second position to facilitate starting said generator when air

is supplied through said first air supply passage and said second air supply passage as disclosed by Oudet et al.; and with sealing means disposed on at least one of an outer surface of said first portion of said piston and an inner surface of said cylinder; in which said sealing means is an O-ring inserted in a groove formed on said outer surface of said first portion of said piston as disclosed by Carroll, for the purpose of having optimal space requirements and avoiding escape of air between the piston and the cylinder.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the piston type control valve disclose by Li with an electric actuated shutoff valve, since the examiner takes Official Notice of the equivalence of the electric actuated shutoff valve and the piston type control valve for their use in the electric generator structure art and the selection of any of these known equivalents to prevent air flow through said generator would be within the level of ordinary skill in the art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the electric coil to a full bridge rectifier since it was known in the art that the full bridge rectifier is used to supply DC electric power whenever a net flux through the coils is changing.

2. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Fiegel et al. (U.S. Pat. No. 5, 826, 952).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that said inlet flow path includes an air filter for excluding foreign material from said cylinder.

Feigel et al. disclose that said inlet flow path includes an air filter (62) to exclude foreign material from said cylinder for the purpose of prevent the ingress of dirt particles.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with an inlet flow path including an air filter for the purpose of excluding foreign material from said cylinder.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Noltner (DE 2355728A).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that said inlet flow path includes a choke to control an impedance of said inlet flow path.

Noltner discloses that said inlet flow path includes a choke (11 and 10) for the purpose of controlling an impedance of said inlet flow path.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide

it with an inlet flow path including a choke for the purpose of controlling an impedance of said inlet flow path.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Dunne et al. (U.S. Pat. No. 3, 661, 051).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that at least one of said outer surface of said piston extension and said inner surface of said cylinder extension is at least one of made from and coated with a low friction material.

Dunne et al. disclose that at least one of said outer surface of said piston extension and said inner surface of said cylinder extension is at least one of made from and coated with a low friction material (column 4, lines 46 to 57) for the purpose of reducing wear on the pistons.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with at least one of said outer surface of said piston extension and said inner surface of said cylinder extension made from and coated with a low friction material as disclosed by Dunne et al. for the purpose of reducing the wear on the pistons surface during operation.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Ball et al. (U.S. Pat. No. 5, 890, 460).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that said exhaust passage includes a muffler to reduce noise released from said generator.

Ball et al. disclose that said exhaust passage includes a muffler to reduce noise released from said generator (1178) for the purpose of reducing noise emitted by the engine and the generator.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with an said exhaust passage including a muffler for the purpose of reducing noise released from said generator.

6. Claims 9 to 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Oudet et al. and further of Carrol in view of Young (U.S. Pat. No. 4, 697, 113).

Li, Oudet et al. and Carrol disclose a pneumatically driven electric power generator as described on item 1 above. However, neither Li, Oudet et al. nor Carrol disclose that said piston extension has at least one longitudinal air passage to carry air to an end of said piston adjacent said end closure, said exhaust being connected to said

end closure; nor that said at least one longitudinal air passage is a longitudinal slot formed in said outer surface of said piston extension.

Young discloses that said piston extension (17) has at least one longitudinal air passage (column 5, lines 3 to 9) to carry air to an end of said piston adjacent said end closure, said exhaust being connected to said end closure; and that said at least one longitudinal air passage is a longitudinal slot formed in said outer surface of said piston extension for the purpose of keeping equal pressures between two different spaces.

It would have been obvious at the time the invention was made to modify the pneumatically driven electric power generator of Li, Oudet et al. and Carrol and provide it with a piston extension having at least one longitudinal air passage to carry air to an end of said piston adjacent said end closure, said exhaust being connected to said end closure; in which said at least one longitudinal air passage being a longitudinal slot formed in said outer surface of said piston extension as disclosed by Young, for the purpose of keeping equal pressures between two different spaces.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone

numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

NESTOR RAMIREZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

GP
March 9, 2000